Numerical Modelling of Indian Summer Monsoon Rainfall Associated with Onset Phase

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Simulation of Indian Summer Monsoon (ISM) Rainfall and its variability during onset phase is an important task to the researchers which plays an important role with Agrarian Indian economy. During the onset phase of the ISM, the spatial and temporal distribution of the rainfall is highly unpredictable. In this study a high resolution regional model Weather Research Forecasting (WRF) developed by NCEP/NCAR, USA is used at a resolution of 27km which covers the monsoon region to simulate the distribution of the rainfall associated during onset phase of the monsoon. The model is integrated for five months duration (May to September) for the decade starting from the year 2000 to 2009 using the NCEP reanalysis data available at 2.5 degree resolution as initial and boundary conditions. The aim of the work is to assess the capability of the new generation regional model WRF in simulating the monsoon rainfall with particular reference to its onset phase.

For each year of the decade the model derived rainfall distribution over Indian sub continent is analyzed and compared with the IMD gridded rainfall data available at 0.5x0.5 degree resolution. The ten year mean of the simulated weekly accumulated rainfall starting from 15 May to 15 July over India are compared with the corresponding IMD gridded rainfall data. Using the 10 year mean seven day rainfall distribution, the mean onset dates of the model are compared with the reported data from India Meteorological Department. In order to assess the model capability to capture the inter annual variation of rainfall between consecutive good and bad monsoon years, the deviation from the mean model simulated onset dates are computed and compared with the IMD reports. The model results are comparable with the observations and the model is able to simulate the bad and good monsoon onset phases.